THE CLAIMS

WHAT IS CLAIMED IS:

1. An isolated protein or peptide comprising a 5 to 50 amino acid segment from β-hCG (SEQ ID NO:2), said protein or peptide having a therapeutic effect selected from the group consisting of anti-HIV effects, anti-cancer effects, anti-wasting effects, and pro-hematopoetic effects.

2. The isolated protein or peptide of claim 1 wherein the 5 to 50 amino acid segment is selected from peptides 40-145 of β-hCG (SEQ ID NO:2).

3. The isolated protein or peptide of claim 1 wherein the 5 to 50 amino acid segment is selected from peptides 40-60 of β-hCG (SEQ ID NO:2).

4. The isolated protein or peptide of claim 1 wherein the β-hCG amino acid segment from has from 5 to 25 amino acids.

5. The isolated protein or peptide of claim 2 wherein the amino acid segment from β-hCG has from 5 to 25 amino acids.

6. The isolated protein or peptide of claim 3 wherein the amino acid segment from β-hCG has from 5 to 25 amino acids.

7. The isolated protein or peptide of claim 1 wherein the β-hCG segment is selected from the group consisting of 41-54, 45-54, 47-53, 41-53, 42-53, 43-53, 44-53, 44-57, 45-53, 46-53, 45-54, 45-55, 45-56, 45-58, 47-54, 47-56, 47-58, 58-145, 7-40, 46-65 and 48-56 (SEQ ID NOS:3-5, 8-19, 21-23 and 33-35, respectively).

8. The isolated protein or peptide of claim 1 which is N-acetylated or has a C-terminal amide or is both N-acetylated and has a C-terminal amide.

9. The isolated protein or peptide of claim 1, which contains an insertion of or substitution with one or more non-classical amino acids or one or more D-amino acids.

10. The isolated protein or peptide of claim 9 wherein the one or more D-amino acids are selected from the group consisting of D-glycine, D-alanine, D-valine, D-levaine, D-isolevcine, D-serine, D-threonine, D-phenylalanine, D-tyrosine, D-tryptophan, D-cysteine, D-methionine, D-proline, D-asperagine, D-glutamine, D-aspartate, D-glutamine, D-lysine, D-arginine, and D-histidine.

11. The isolated protein or peptide of claim 9 wherein the one or more non-classical amino acids are selected from the group consisting of 2,4-diaminobutyric acid, α-amino isobutyric acid, 4-amino-butyric acid, Abu, 2-amino butyric acid, γ-Abu, ε-Ahx, 6-aminohexanoic acid, Aib, 2-aminoisobutyric acid, 3-amino propionic acid, ornithine, norleucine, norvaline, hydroxyproline, sarcosine, citrulline, homocitrulline, cysteic acid, t-butylglycine, t-butylalanine, phenylglycine, cyclohexylalanine, β-alanine, flouro-amino acids, β-methyl amino acids, Cα-methyl amino acids, amino acid analogues, and D-isomers of alanine, arginine, asparagine, aspartate, cysteine, glutamate, glutamine, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, and valine.

12. The isolated protein or peptide of claim 1 comprising two or more at least five amino acid, non-naturally contiguous portions of the sequence of β-hCG (SEQ ID NO:2) wherein the portions are linked via a peptide bond between the N-terminus of a first the portion and the C-terminus of a second the portion, the protein or peptide having at least one therapeutic effect selected from the group consisting of anti-HIV effects, anti-cancer effects, anti-wasting effects, and pro-hematopoetic effects.

13. The isolated protein or peptide of claim 12 which is a fusion protein or peptide comprising the β-hCG amino acid sequences joined via a peptide bond to a protein or peptide sequence of a protein or peptide different from β-hCG.

14. The isolated protein or peptide of claim 12 wherein the amino acid sequence of the protein or peptide is selected from the group consisting of:

(a) β-hCG amino acids 45-57 (SEQ ID NO:6) linked at the C-terminus via a peptide bond to the N-terminus of β-hCG amino acids 109-119 (SEQ ID NO:7);

(b) β-hCG amino acids 110-119 (SEQ ID NO:27) linked at the C-terminus via a peptide bond to the N-terminus of β-hCG amino acids 45-57 (SEQ ID NO:6); and

(c) β-hCG amino acids 47-57 (SEQ ID NO:28) linked at the C-terminus via a peptide bond to the N-terminus of β-hCG amino acids 108-119 (SEQ ID NO:29).

15. A circularized protein or peptide, the amino acid sequence of which consists of one or more portions of the sequence of β-hCG (SEQ ID NO:2), the protein or peptide having at least one therapeutic effect selected from the group consisting of anti-HIV effects, anti-cancer effects, anti-wasting effects, and pro-hematopoetic effects.

16. The circularized protein or peptide of claim 15 wherein a cysteine residue is inserted or substituted for a different amino acid residue in at least one of the one or more portions of the sequence, the one or more portions of the sequence containing a second cysteine residue, and wherein a disulfide bond is formed between the inserted or substituted

cysteine residue and the second cysteine residue present in the one or more portions of the sequence.

17. The circularized peptide according to claim 15 having at least two cysteine residues, optionally wherein:

(a) at least one cysteine residue has been inserted between two non-cysteine amino acid residues;

(b) at least one cysteine residue has been coupled at an end of the amino acid sequence; or

(c) at least one non-cysteine amino acid residue has been replaced by a cysteine residue;

wherein two cysteine residues are coupled together by a disulfide bond.

18. The circularized protein or peptide of claim 15 wherein the at least one portion of the sequence is selected from the group consisting of amino acid numbers 41-54, 45-54, 47-53, 45-57, 109-119, 41-53, 42-53, 43-53, 44-53, 44-57, 45-53, 46-53, 45-54, 45-55, 45-56, 45-58, 47-54, 47-57, 47-56, 47-58, 48-145, 58-145, 109-145, 7-40, 46-65, and 48-56 (SEQ ID NOS:3-25 and 33-35, respectively).

19. The circularized protein or peptide of claim 15, the amino acid sequence of which consists of β-hCG amino acid numbers 44-57 (SEQ ID NO:12), with cysteine substituted for valine at position 44.

20. The circularized protein or peptide of claim 15, the amino acid sequence of which consists of two or more at least 5 amino acid, non-naturally contiguous portions of the sequence of β-hCG (SEQ ID NO:2) wherein the portions are linked via a peptide bond between the N-terminus of a first the portion and the C-terminus of a second the portion.

21. The circularized protein or peptide of claim 20 wherein:

(a) the first the portion consists of β-hCG amino acid numbers 45-57 (SEQ ID NO:6);

(b) the second the portion consists of β-hCG amino acid numbers 110-119 (SEQ ID NO:27); and

(c) a disulfide bond is formed between the cysteine residues at amino acids 57 and 110 of the portions.

22. An isolated protein or peptide, the amino acid sequence of which consists of one or more portions of the sequence of β-hCG (SEQ ID NO:2) wherein one or more residues in at least one of the portions of the sequence are substituted by an amino acid or amino acid analog having a side chain with an amino or carboxyl group, the amino or carboxyl group forming a peptide bond with a second sequence of one or more amino acids, the protein or peptide having at least one therapeutic effect selected from the group consisting of anti-HIV effects, anti-cancer effects, anti-wasting effects, and pro-hematopoetic effects.

23. The isolated protein or peptide of claim 22 wherein the one or more proteins each comprises a sequence of at least five amino acids of the sequence of β-hCG (SEQ ID NO:2).

24. The isolated protein or peptide of claim 22 wherein the one or more proteins each comprises a sequence of 5 to 50 amino acids of the sequence of β-hCG (SEQ ID NO:2).

25. The isolated protein or peptide of claim 22 wherein the one or more proteins each comprises a sequence of 5 to 25 amino acids of the sequence of β-hCG (SEQ ID NO:2).

26. The isolated peptide of claim 24 wherein at least one portion of the sequence is selected from β-hCG 40-145.

27. The isolated peptide of claim 25 wherein at least one portion of the sequence is selected from β-hCG 40-145.

28. The isolated peptide of claim 25 wherein at least one portion of the sequence is selected from β-hCG 40-60.

29. The isolated protein or peptide of claim 22 wherein at least one portion of the sequence consists of amino acid numbers 41-54, 45-54, 47-53, 45-57, 109-119, 41-53, 42-53, 43-53, 44-53, 44-57, 45-53, 46-53, 45-54, 45-55, 45-56, 45-58, 47-54, 47-57, 47-56, 47-58, 48-145, 58-145, 109-145, 7-40, 46-65, and 48-56 (SEQ ID NOS:3-25 and 33-35, respectively).

30. The isolated protein or peptide of claim 22 wherein the at least one portion of the sequence consists of amino acid numbers 45-57 (SEQ ID NO:6).

31. The isolated protein or peptide of claim 30 wherein substitutions by the amino acid or amino acid analog occur at least at residues 47 and 51 of the portion.

32. The isolated protein or peptide of claim 22 wherein the one or more residues are each substituted by a diaminobutyric acid residue and the side chain amino group of the

diaminobutyric acid residue is peptide bonded to a sequence of one or more proline residues.

33. An isolated protein or peptide, comprising an amino acid sequence consisting of β-hCG 45-57 wherein the residues at positions 47 and 51 are each substituted by a diaminobutyric acid residue and the side chain amino group of the diaminobutyric acid residue is peptide bonded to a proline residue, the protein or peptide having at least one therapeutic effect selected from the group consisting of anti-HIV effects, anti-cancer effects, anti-wasting effects, and pro-hematopoetic effects.

34. A circularized protein or peptide, the amino acid sequence of which consists of one or more portions of the sequence of β-hCG (SEQ ID NO:2) wherein one or more residues the at least one or the one or more portions of the sequence are substituted by an amino acid or amino acid analog having a side chain the protein or peptide having at least one therapeutic effect selected from the group consisting of anti-HIV effects, anti-cancer effects, anti-wasting effects, and pro-hematopoetic effects.

35. The circularized protein or peptide of claim 34 wherein a cysteine residue is inserted or substituted for a different amino acid residue in at least one of the one or more portions of the sequence, the one or more portions of the sequence containing a second cysteine residue, and wherein a disulfide bond is formed between the inserted or substituted cysteine residue and the second cysteine residue present in the one or more portions of the sequence.

36. The circularized protein or peptide of claim 35 wherein one or more residues of the at least one or the one or more portions of the sequence are substituted by an amino acid or amino acid analog having a side chain with an amino or carboxyl group, the amino or carboxyl group forming a peptide bond with a second sequence of one or more amino acids.

37. The circularized protein or peptide of claim 34 wherein:

(a) at least one cysteine residue has been inserted between two non-cysteine amino acid residues;

(b) at least one cysteine residue has been coupled at an end of the amino acid sequence; or

(c) at least one non-cysteine amino acid residue has been replaced by a cysteine residue;

wherein two cysteine residues are coupled together by a disulfide bond.

38. A circularized protein or peptide, the amino acid sequence of which consists of β-hCG amino acid numbers 44-57 (SEQ ID NO:12) (a portion of (SEQ ID NO:2) with cysteine substituted for valine at position 44, and wherein a disulfide bond is formed between the cysteine residue substituted at position 44 and the cysteine residue present at position 57, and wherein the residues at positions 47 and 51 are each substituted by a diaminobutyric acid residue and the side chain amino group of the diaminobutyric acid residue is peptide bonded to a proline residue.

39. An isolated protein or peptide:

(a) comprising a β-hCG amino acid sequence consisting of amino acid numbers 41-54, 45-54, 47-53, 41-53, 42-53, 43-53, 44-53, 44-57, 45-53, 46-53, 45-54, 45-55, 45-56, 45-58, 47-54, 47-56, 47-58, 58-145, 7-40, 46-65 and 48-56 (SEQ ID NOS:3-5, 8-19, 21-23 and 33-35, respectively) (a portion of SEQ ID NO:2); and

(b) lacking β-hCG amino acids contiguous to the sequence.

40. A first composition comprising one or more first components of a second composition comprising a sample of native hCG or native β-hCG, the first components being separated from other components of the hCG or β-hCG sample, the native hCG or β-hCG sample not being purified to homogeneity in the second composition, the first components and the second composition having at least one therapeutic effect selected from the group consisting of anti-HIV effects, anti-cancer effects, anti-wasting effects, and pro-hematopoetic effects.

Sub. D2

41. The first composition of claim 40 wherein the first components have an approximate apparent molecular weight selected from the group consisting of 40 kD, 15 kD and 3 kD, wherein the apparent molecular weight is determined by elution from a gel filtration sizing column relative to the elution of a native hCG heterodimer, having a molecular weight of 77 kD, and a β-hCG core protein or peptide, having a molecular weight of 10 kD.

42. A first composition produced by a process comprising the following steps:

Sub. C2

(a) subjecting a second composition comprising native hCG or native β-hCG to a size fractionation procedure, the native hCG or native β-hCG not being purified to homogeneity in the second composition, the second composition having at least one therapeutic effect selected from the group consisting of anti-HIV effects, anti-cancer effects, anti-wasting effects, and pro-hematopoetic effects; and

(b) recovering fractions having such effects.

43. The first composition of claim 42 wherein the recovered fractions contain material having an approximate apparent molecular weight selected from the group consisting of 40 kD, 15 kD and 3 kD, wherein the apparent molecular weight is determined by elution from a gel filtration sizing column relative to the elution of a native hCG heterodimer, having a molecular weight of 77 kD, and a β-hCG core protein or peptide, having a molecular weight of 10 kD.

44. The first composition of claim 42, wherein the second composition is early pregnancy urine.

45. A method for producing a first composition having at least one therapeutic effect selected from the group consisting of anti-HIV effects, anti-cancer effects, anti-wasting effects, and pro-hematopoetic effects, said method comprising:

(a) subjecting a second composition comprising native hCG or native β-hCG to a size fractionation procedure, the native hCG or native β-hCG not being purified to homogeneity in the second composition, the second composition having at least one therapeutic effect selected from the group consisting of anti-HIV effects, anti-cancer effects, anti-wasting effects, and pro-hematopoetic effects;

(b) recovering fractions active to inhibit HIV infection or replication or Kaposi's sarcoma or having a pro-hematopoietic effects.

Sub. C2

46. The method of claim 45 wherein the size fractionation procedure comprises the steps:

(a) loading the second composition onto a gel filtration sizing column in a first buffer of 30 mM sodium phosphate, pH 8.3;

(b) eluting components of the second composition from the column with second buffer of 30 mM sodium phosphate, pH 7.0 and 2 M sodium chloride; and

(c) recovering fractions of the second composition having been eluted from the column.

47. The method of claim 45 wherein the gel filtration sizing column is a SUPERDEX 200™ column and wherein the recovered fractions contain material having an approximate apparent molecular weight selected from the group consisting of 40 kD, 15 kD and 3 kD, wherein the apparent molecular weight is determined by elution from the SUPERDEX™ 200 column relative to the elution of a native hCG heterodimer, having a molecular weight of 77 kD, and a β-hCG core protein or peptide, having a molecular weight of 10 kD.

48. The method of claim 47 wherein the second composition is early pregnancy urine.

49. The method of claim 48 wherein prior to subjecting the second composition to a size fractionation procedure, the second composition is subjected to the following steps:

(a) adjusting the pH of the urine to a pH of approximately 7.2 causing the formation of a precipitate;

(b) removing the precipitate from the urine;

(c) concentrating the urine;

(d) removing salt and lipid from the urine; and

(e) lyophilizing the urine.

Sub. C3

50. A method of treating or preventing a condition selected from the group consisting of HIV infection, cancer, wasting, and hematopoetic deficiency, in a human subject in need of such treatment or prevention, said method comprising administering to the subject an amount of a purified protein or peptide effective to treat or prevent HIV infection wherein the protein or peptide comprises one or more portions of the amino acid sequence of β-hCG, a peptide having an amino acid sequence consisting of the one or more portion being active to inhibit HIV infection or replication.

51. The method of claim 52 wherein the portion of the β-hCG amino acid sequence of β-hCG consists of from 5 to 50 amino acids.

52. The method of claim 52 wherein the portion of the β-hCG amino acid sequence is selected from peptides 40-145 of β-hCG (SEQ ID NO:2).

53. The method of claim 52 wherein the portion of the β-hCG amino acid sequence is selected from peptides 40-60 of β-hCG (SEQ ID NO:2).

54. The method of claim 52 wherein the portion of the β-hCG amino acid sequence has from β-hCG 5 to 25 amino acids.

55. The method of claim 52 wherein the portion of the β-hCG amino acid sequence has from β-hCG 5 to 15 amino acids selected from amino acids 40-60 of the amino acid sequence of β-hCG (SEQ ID NO:2).

56. The method of claim 52 wherein the portion of the β-hCG amino acid sequence is selected from the group consisting of amino acid numbers 41-54, 45-54, 47-53, 45-57,

41-53, 42-53, 43-53, 44-53, 44-57, 45-53, 46-53, 45-54, 45-55, 45-56, 45-58, 47-54, 47-55, 47-56, 47-58, 48-145, 58-145, 7-40, 46-65 and 48-56 (SEQ ID NOS:3-6, 8-24, and 33-35, respectively).

57. The method of claim 50 wherein the purified protein or peptide comprises two or more at least five amino acid, non-naturally contiguous portions of the amino acid sequence of β-hCG (SEQ ID NO:2), wherein the portions are linked via a peptide bond between the N-terminus of a first the portion and the C-terminus of a second the portion.

58. The method of claim 57, wherein the amino acid sequence of the protein or peptide is selected from the group consisting of:

(a) β-hCG amino acids 45-57 (SEQ ID NO:6) linked at the C-terminus via a peptide bond to the N-terminus of β-hCG amino acids 109-119 (SEQ ID NO:7);

(b) β-hCG amino acids 110-119 (SEQ ID NO:27) linked at the C-terminus via a peptide bond to the N-terminus of β-hCG amino acids 45-57 (SEQ ID NO:6); and

(c) β-hCG amino acids 47-57 (SEQ ID NO:28) linked at the C-terminus via a peptide bond to the N-terminus of β-hCG amino acids 108-119 (SEQ ID NO:29), (SEQ ID NO:2).

59. A method of treating or preventing a condition selected from the group consisting of HIV infection, cancer, wasting, and hematopoetic deficiency, in a human subject in need of such treatment or prevention, said method comprising administering to the subject an amount of a pharmaceutical formulation comprising:

(a) a circularized protein or peptide, the amino acid sequence of which consists of one or more portions of the sequence of β-hCG (SEQ ID NO:2), the protein or peptide having at least one therapeutic effect selected from the group consisting of anti-HIV effects, anti-cancer effects, anti-wasting effects, and pro-hematopoetic effects; and

(b) a pharmaceutically acceptable carrier.

60. The method of claim 59 wherein a cysteine residue is inserted or substituted for a different amino acid residue in at least one of the one or more portions of the sequence, the one or more portions of the sequence containing a second cysteine residue, and wherein a disulfide bond is formed between the inserted or substituted cysteine residue and the second cysteine residue present in the one or more portions of the sequence

61. The method of claim 60 wherein one or more residues in at least one of the one or more portions of the sequence are substituted by an amino acid or amino acid analog having a

side chain with an amino or carboxyl group, the amino or carboxyl group forming a peptide bond with a second sequence of one or more amino acids.

62. The method of claim 59 having at least two cysteine residues, optionally wherein:

(a) at least one cysteine residue has been inserted between two non-cysteine amino acid residues;

(b) at least one cysteine residue has been coupled at an end of the amino acid sequence; or

(c) at least one non-cysteine amino acid residue has been replaced by a cysteine residue;

wherein two cysteine residues are coupled together by a disulfide bond.

63. The method of claim 59 wherein the at least one portion of the sequence is selected from the group consisting of amino acid numbers 41-54, 45-54, 47-53, 45-57, 109-119, 41-53, 42-53, 43-53, 44-53, 44-57, 45-53, 46-53, 45-54, 45-55, 45-56, 45-58, 47-54, 47-57, 47-56, 47-58, 48-145, 58-145, 109-145, 7-40, 46-65, and 48-56 (SEQ ID NOS:3-25 and 33-35, respectively).

64. The method of claim 59, wherein the circularized protein or peptide has an amino acid sequence which consists of β-hCG amino acid numbers 44-57 (SEQ ID NO:12) (a portion of (SEQ ID NO:2) with cysteine substituted for valine at position 44, and wherein the residues at positions 47 and 51 of the portion are each substituted by a diaminobutyric acid residue and the side chain amino group of the diaminobutyric acid residue is peptide bonded to a proline residue.

65. A method of treating or preventing a condition selected from the group consisting of HIV infection, cancer, wasting, and hematopoetic deficiency, in a human subject in need of such treatment or prevention, said method comprising administering to the subject an amount of a purified protein or peptide effective to treat or prevent HIV infection, which protein or peptide:

(a) comprises a portion of the amino acid sequence of β-hCG, a protein or peptide comprising such portion being active to inhibit HIV infection or replication; and

(b) lacks β-hCG amino acids contiguous to the portion.

66. The method of claim 65 wherein the portion has a sequence selected from the group consisting of amino acid numbers 41-54, 45-54, 47-53, 45-57, 109-119, 45-57, 41-53, 42-53, 43-53, 44-53, 44-57, 45-53, 46-53, 45-54, 45-55, 45-56, 45-58, 47-54, 47-57, 47-

55, 47-56, 47-58, 48-145, 58-145, 109-145, 7-40, 46-65, and 48-56 (SEQ ID NOS:3-25 and 33-35 respectively).

67. The method of claim 65 wherein the portion consists of amino acid numbers 45-57 (SEQ ID NO:6) (a portion of SEQ ID NO:2).

68. A method of treating or preventing a condition selected from the group consisting of HIV infection, cancer, wasting, and hematopoetic deficiency, in a human subject in need of such treatment or prevention comprising administering to the subject an amount of the first composition a therapeutically or preventatively effective amount of a first composition comprising one or more first components of a second composition comprising a sample of native hCG or native β-hCG, the first components being separated from other components of the hCG or β-hCG sample, the native hCG or β-hCG sample not being purified to homogeneity in the second composition, the first components and the second composition having at least one therapeutic effect selected from the group consisting of anti-HIV effects, anti-cancer effects, anti-wasting effects, and pro-hematopoetic effects.

69. The method of claim 68 wherein the first components have an approximate apparent molecular weight selected from the group consisting of 40 kD, 15 kD and 3 kD.

70. The method of claim 69, wherein the apparent molecular weight is determined by elution from a gel filtration sizing column relative to the elution of a native hCG heterodimer, having a molecular weight of 77 kD, and a β-hCG core protein or peptide, having a molecular weight of 10 kD.

71. A method of treating or preventing a condition selected from the group consisting of HIV infection, cancer, wasting, and hematopoetic deficiency, in a human subject in need of such treatment or prevention comprising administering to the subject an amount of a first composition effective to treat or prevent HIV infection, the first composition being produced by a process comprising the following steps:

(a) subjecting a second composition comprising native hCG or native β-hCG to a size fractionation procedure, the native hCG or native β-hCG not being purified to homogeneity in the second composition, the second composition having at least one therapeutic effect selected from the group consisting of anti-HIV effects, anti-cancer effects, anti-wasting effects, and pro-hematopoetic effects.

(b) recovering fractions having such effects.

72. The method of claim 71 wherein the recovered fractions contain material having an approximate apparent molecular weight selected from the group consisting of 40 kD, 15 kD and 3 kD.

73. The method of claim 72 wherein the apparent molecular weight is determined by elution from a gel filtration sizing column relative to the elution of a native hCG heterodimer, having a molecular weight of 77 kD, and a β-hCG core protein or peptide, having a molecular weight of 10 kD.

Sub. D4

74. A method of screening a preparation comprising hCG or β-hCG or a fraction of an hCG or β-hCG preparation or one or more portions of β-hCG for at least one therapeutic effect selected from the group consisting of anti-HIV effects, anti-cancer effects, anti-wasting effects, and pro-hematopoetic effects, comprising assaying the fraction for such effects.

75. A pharmaceutical composition comprising:

(a) a therapeutically effective amount of a purified protein or peptide comprising an amino acid sequence consisting of a sequence selected from the group consisting of amino acid numbers 41-54, 45-54, 47-53, 45-57, 41-53, 42-53, 43-53, 44-53, 44-57, 45-53, 46-53, 45-54, 45-55, 45-56, 45-58, 47-54, 47-56, 47-58, 48-145, 58-145, 7-40, 46-65 and 58-56 (SEQ ID NOS:3-5, 8-19, 21, 22, 24, and 33-35, respectively) (a portion of SEQ ID NO:2); and

(b) a pharmaceutically acceptable carrier.

76. A pharmaceutical composition comprising

(a) the protein or peptide of claim 1; and

(b) a pharmaceutically acceptable carrier.

77. A pharmaceutical composition comprising

(a) the protein or peptide of claim 15; and

(b) a pharmaceutically acceptable carrier.

78. A pharmaceutical composition comprising

(a) the protein or peptide of claim 22; and

(b) a pharmaceutically acceptable carrier.

79. A pharmaceutical composition comprising

(a) the protein or peptide of claim 34; and

(b) a pharmaceutically acceptable carrier.

80. A pharmaceutical composition comprising

(a) the protein or peptide of claim 38; and

(b) a pharmaceutically acceptable carrier.

81. A pharmaceutical composition comprising

(a) the protein or peptide of claim 39; and

(b) a pharmaceutically acceptable carrier.

82. A pharmaceutical composition comprising

(a) the first composition of claim 40; and

(b) a pharmaceutically acceptable carrier.

83. A pharmaceutical composition comprising

(a) the protein or peptide of claim 42; and

(b) a pharmaceutically acceptable carrier.